LOOK BACK!

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Over the years Word Ways has displayed a varied logological corpus. In this column I revisit forgotten ideas, connect seemingly-disparate concepts, and suggest further investigations.

The word DISROBE can be dissected into two constituent words, DIRE and SOB; the letters in the shorter words both appear in their correct order in the parent one. The National Puzzlers' League calls puzzles based on words of this nature *word interlocks*. The concept was first proposed by Archimedes in the June 1945 issue of The Enigma. He gave examples such as PIcTure, POsTure, RAmPart, PUrPose and LAmPoon in which the interlock was minimal, consisting of the first letter of the second word preceding the last
letter of the first word. More elaborate examples like BAlCONies and PirATe he called *word weaves*, but this terminology never caught on; nowadays all are called interlocks. He even proposed multiple-word interlocks such as Sta**l**AGm**it**e (sag, tame, lit) and PeRver**sit**Y (pry, ever, sit).

However, the idea never caught on. It was reintroduced by Brutus in the April 1977 Enigma; fourteen puzzles appeared in the June through December issues, including a reversal (TrIaNgleS: SNIT, elgar) and a double one (FIRearMs, FIreaRmS).

Special cases of the interlock were already known. The oldest was the *charade* (CHARTreuse) which long preceded the National Puzzlers' League as a puzzle type. According to Will Shortz in "Early American Word Puzzles" in the November 1974 Word Ways, the charade appeared in the February 1752 issue of the London magazine (PORTSmouth), and by 1769 one had appeared in the Philadelphia Penny Post.

Arcanus presented the *word deletion* in the August 1929 Enigma, in which a constituent word is taken from the interior of the parent and the ends pushed together to form a second constituent word (COMPLexitIES). In the February 1973 Enigma, Tut generalized this to the *progressive word deletion* (MEdi**came**nT: came, din, met).

The third special case is the *alternade*, in which the odd letters of the parent form one constituent, and the even letters another. The first example of this, by L'Allegro, appeared in the May 1917 Eastern Enigma, showing that SCHOOLED contains SHOE and COLD. During the next 42 years, 60 alternades on 44 different parent words were published. The most noted of these was the eleven-letter TRIENNIALLY, factoring into TINILY and RENAL, discovered by Dorse and appearing in the September 1949 Enigma.

Dmitri Borgmann mentioned TRIENNIALLY in his *Language on Vacation* (1965), and generalized the concept to the trinade (PACIFICATORY: paco, afar, city), the quaternade (PANTALOONERY: pan, ale, nor, try), and the quinade (PARASITOLOGICAL: pig, ati, roc, ala, sol).

The alternade is much harder to find than the charade or the word deletion; the constituent parts of the latter ones leap out from the parent word. This may account for the slow production of

alternades, which require the computer to be revealed. The August and November 2000 issues of Word Ways featured a comprehensive investigation by Rex Gooch, who found 3576, 1141, 167, 14 and 1 alternades of 8 through 12 letters, and 10364, 2303, 560, 110, 16 and 2 trinades of 10 through 15 letters. (His single 12-letter alternade was, appropriately, ALTERNATIONS, splitting into "take the A TRAIN" and LENTOS.)

The only Word Ways article entirely devoted to word interlocks was "Pig Lawns and Diaper Spas" by Christopher McManus in November 1993 (these two phrases being the constituents of LApWiNgS and DIsAPpEaRs, respectively). His database was 178,000 words.

McManus introduced the concept of the number of transitions between constituents; for example, in DIsRobE there are four, between I and S, S and R, R and O, and B and E. The more transitions, the more well-concealed the constituent words are. He defined *word interweaves*, parent words of eight or more letters with at least six transitions. In theory, there are 8, 37, 110, 351, 737, 2004, 3682, 9605 and 15990 different word interweaves for parents of 8 through 16 letters. In practice, he found 763, 981, 662, 445, 226, 131, 53, 27 and 12 for words of 8 through 16 letters. He found 11 transitions for ARtEriOpLAsTiEs, exceeding the 10 in TrIeNnIaLlY. The 15 parents with 9 transitions were AchEiRIcAlLy, COuraGeOusNeSs, CoUrTlIeSt, CoUrTlINeSs, DEpaRtMent-AlLy, IsChIoCeLEs, PaRANuClEaRs, PlEoNosTeOSEs, PlEuROcentRAlLy, PoUrPArTiEs, PsYlLiAtEs, SaTuRAtIoNs, ScHolARliNeSs, SOLicItOusNeSs, and SpEaRhEaDs. Orlet, pourparty and pahas are in Webster's Second; aulas, departmentally and pylae in Webster's Third.

Two words form interweaves in five ways, PLAINNESS (planes + ins, pans + lines, pins + lanes, panes + lis, panes + lins) and STEARINES (series + tan, stains + ere, sere + tains, serins + tae, sains + tere (in Webster's Second)). However, if one is not limited to word interweaves, one can find eleven different pairs of constituents for BROILED (boil + red, role + bid, roil + bed, bile + rod, bred + oil, brie + old, bole + rid, bled + roi, bold + rie, rile + bod, bild + roe).

If a word of j letters has n different interlocks then a word of j + 1 letters has 2n + 1 different interlocks. Thus, the number of different interlocks, each of two or more letters, for words of 4 through 10 letters are 3, 10, 25, 56, 119, 246 and 501. I published a type collection of 8-letter interlocks in the May/June 1978 issue of the British magazine Games & Puzzles. Note that 1234, 123, 678, 78 and 12 are charades, 1238, 1278, 1678, 128, 234, 345, 456, 567, 178 and 18 are word deletions, and 1357 is an alternade.

1234 BILLfold
1235 DRUmBeat
1236 SPAviNed
1237 BONfirEs
1238 MANfullY
1245 BIrDSeed
1246 VArIaNts
1247 DIsRobEs
1248 AIlMentS
1256 PAreNTal
1257 TAmaRiNd
1258 AChiEveS
1267 REageNTs
1268 FIreaRmS
1278 REcentLY
127 PAstilLe
128 REverseD
134 BrUTally
135 ScOlDing
136 AmPutEes
137 TrAileRs
138 SoUtherN
145 ParADise
146 ParIeTal
147 SpoIleRs
148 FinAgleR
156 BassINet
157 CherOoTs
158 ForeLadY
167 EvaluATe
378 spRoutED
456 magNETic
457 genDArMe
458 spiRIteD
467 genErATe
458 forEmAsT
478 basSinET
567 habiTANt
568 signPOsT
578 homeBrED
678 chestNUT

12 INstance
13 AnNotate
14 MatErial

1345 SpOILage
1346 DrAWiNgs
1347 PaINleSs
1348 PrETendS
1356 FrIeNDly
1357 ScHoOlEd
1358 BlEeDerS
1367 CrOutONs
1368 BeAraBlE
1378 OrNateLY
1456 BreATHed
1457 TamARiNd
1458 HemATitE
1467 FeaRsOMe
1468 FinEnEsS
1478 TriAngLE
1567 ProtESTs
1568 BracELeT
1578 ProtEsTS
1678 BlackOUT

123 MADhouse
124 SUpErior
125 CAstRate
126 FAsteNer

168 CleveRlY
178 SlightLY
234 eYESight
235 sPItTing
236 sTEerAge
237 pARlanCe
238 mALariaL
245 aRgUMent
246 sMoUlDer
247 aCcOutRe
248 dErRierE
256 cAleNDar
257 pHarIsEe
258 pAlaTinE
267 aPparENt
268 pHantAsM
278 sLightED
345 stANDing
346 maYApPle
347 inDOleNt
348 stRIateD
356 deFiANce
357 caSsEtTe
358 caPrIolE
367 inHerENt
368 chLorIdE

15 HostEler
16 AflutTer
17 OrangeRy
18 AbridgeS
23 cASement
24 sItTings
25 pAinTing
26 sHadiEst
27 cHoralEs
28 aUctionS
34 nuISance
35 reAsSume
36 prIesTly
37 gaMmonEd
38 spIriteD
45 sinISter
46 porPoIse
47 parAdiSe
48 manAgerS
56 imagINes
57 terrAiNs
58 soldIerS
67 simplIFy
68 misleAdS
78 objectOR

It should be possible, using the computer, to construct a type collection of nine-letter or even ten-letter word interlocks.

One can place added constraints on the interlocks. For example, is it possible to find a set of word interlocks in which a given word appears in every possible position? It can be done for AT in five-letter words: ATone, ApTly, AcuTe, AparT, rATed, pArTy, pAinT, irATe, giAnT, carAT. Can the reader find a three-letter word which can similarly placed in 20 six-letter words?

One can restrict the interlock yet further by insisting that the same two words be interlocked in all possible ways to form a larger word. This is a special problem in word transpositions. If the two-letter words are denoted by AB and CD, one must find three four-letter words with the patterns ABCD or CDAB, ACBD or CADB, and ACDB or CABD. One example is HaEt (a Scots word meaning "a whit"), HatE, and HEat; can readers find others?